

## A NEW MOEBELIA SPECIES FROM CHINA AND COMPARISON WITH EUROPEAN *M. PENICILLATA* (WESTRING, 1851) (ARANEAE, LINYPHIIDAE)

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**Abstract** *Moebelia* Dahl, 1886 is first reported from China. *Moebelia rectangula* sp. nov. is described. Detailed comparison of the new species to the type species, *Moebelia penicillata* (Westring, 1851) is given. Morphological descriptions and illustrations of both species are provided.

**Key words** *Erigoninae*, Palearctic Realm, monotypic genus, male palp, epigynum.

### 1 Introduction

The genus *Moebelia* Dahl, 1886 is a monotypic genus known from the Palearctic Realm. Recent collections from Hebei and Beijing, China taken during Sep. 2005 yielded a second species of *Moebelia* and the first record of the genus from China. Here we compare our new species to specimens of *M. penicillata* from Kareva, Finland. The results show that although the two species are similar in many respects including the overall conformation of the genitalic structures, they differ significantly in details of the genitalia.

### 2 Material and Methods

Specimens were examined using an Olympus-SZ11 stereomicroscope and illustrated using an Olympus-BX41 compound microscope equipped with a drawing tube. Male left palps and female epigyna were illustrated after being separated from the body. Embolic divisions were dissected from the palpal bulb using sharp pins and forceps. Genital organs were immersed in 75% alcohol and examined under a compound microscope; embolic divisions and vulvae were mounted in Hoyer's Solution by strong transmitted light against a white background. In addition, the cuticle of epigyna was removed by sharp pins and forceps when duct system of vulvae was observed.

Eye diameters were measured at the widest points. Leg measurements are shown as: total length (femur, patella, tibia, metatarsus, tarsus). All measurements are given in millimeters. Terminology for genitalic structures follows Hormiga (2000). Only original description is cited; see Platnick (2007) for further synonyms and references.

The following abbreviations are used in the text and

figures.

Somatic morphology. ALE, anterior lateral eye; AME, anterior median eye; PLE, posterior lateral eye; PME, posterior median eye; Tm<sub>1</sub>, position of first metatarsal trichobothrium; Tm<sub>4</sub>, fourth metatarsal trichobothrium.

Male palp. C, column; BH, basal haematodocha; DSA, distal suprategular apophysis; E, embolus; G, a groove in distal suprategular apophysis; PC, paracymbium; PT, protegulum; PTA, prolateral tibial apophysis; R, radix; RTA, retrolateral tibial apophysis; SPT, suprategulum; ST, subtegulum; T, tegulum; TP, tailpiece of radix.

Epigynum. A, atrium; CD, copulatory duct; CO, copulatory opening; DP, dorsal plate; DPD, dorsal plate depression; FD, fertilization duct; FO, fertilization opening; S, spermatheca; VP, ventral plate.

Specimens studied in the current paper are deposited in the Institute of Zoology, Chinese Academy of Sciences (IZCAS) and in the Institute of Biological Problems for the North, Russian Academy of Sciences in Magadan (RAS).

### 3 Taxonomy

*Moebelia rectangula* sp. nov. (Figs. 1-11)

Type material. Holotype male (IZCAS), Zhangshiyan Scenic Area, Zhanhuang County, Shijiazhuang City, Hebei Province, China (37.6°N, 114.3°E), 12 Sep. 2005, collected by LI Shu-Qiang, SONG Yan-Jing, ZHENG Guo and WANG Qian. Paratypes: 8 females and 12 males (IZCAS), with same data as holotype; 4 females and 7 males (IZCAS), Mentougou District, Beijing City (39.9°N, 116.0°E), 21 Sep. 2005, collected by WANG Qian, ZHENG Guo

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**Diagnosis.** *Moebelia* species can be distinguished by the position of the metatarsus trichobothrium, 0.30-0.33 in *M. rectangula*, 0.57-0.60 in *M. penicillata*. Males further distinguished by the presence of a cluster of macrosetae on the retrodorsal part of the palpal tibia in *M. penicillata* (Fig. 14), absent in *M. rectangula* (Fig. 3); by the shape of the prolateral tibial apophysis, which is expanded and rectangular distally in *M. rectangula* (Fig. 3), tapered in *M. penicillata* (Fig. 14), as well as a highly sclerotized fingerlike retrolateral tibial apophysis (Fig. 3), smaller, less well sclerotized in *M. penicillata* (Fig. 14); by the shape of the tailpiece, which is nearly straight and pointed only slightly upwards in *M. rectangula* (Fig. 5), curved upwards in *M. penicillata* (Fig. 15); by the presence of a small triangular tooth on the outer margin of the distal suprategular apophysis groove in *M. penicillata* (Fig. 15), absent in *M. rectangula*; by the distal part of the suprategular apophysis, which is membranous in *M. penicillata* (Fig. 18), slightly sclerotized in *M. rectangula* (Fig. 11). Females further distinguished by the shape of the posterior margin of the epigynum, which is narrow in *M. penicillata* (Fig. 20), wide in *M. rectangula* (Fig. 8); by the nearly flat ventral margin of the dorsal plate in posterior view in *M. rectangula* (Fig. 10), concave in *M. penicillata* (Fig. 17); by the spacing of the spermathecae, separated by nearly their diameter in *M. rectangula* (Fig. 9), by nearly twice their diameter in *M. penicillata* (Fig. 19), and by shape of the copulatory ducts.

**Description.** Male (holotype). Total length 1.03. Cephalothorax 0.55 long, 0.38 wide, pale yellow, black around eyes. Abdomen light grey. Clypeus 0.07 high. AME diameter 0.028, ALE 0.050, PME 0.053, PLE 0.056, AME separation 0.31 times their diameter, AME-ALE separation 0.25 times one ALE diameter, PME separation 0.65 times their diameter, PME-PLE separation 0.28 times one PLE diameter. Sternum 0.37 long, 0.32 wide, dusky yellow. Coxa separation 1.07 times their width. Chelicerae pale yellow, with 4 promarginal teeth, 4 retromarginal teeth. Legs dusky yellow. Tibia 5.50 times longer than thick; Tm 0.33. Leg measurements: : 1.41 (0.43, 0.19, 0.34, 0.25, 0.20); : 1.46 (0.43, 0.21, 0.31, 0.24, 0.27); : 1.16 (0.33, 0.14, 0.23, 0.22, 0.24); : 1.69 (0.51, 0.18, 0.41, 0.31, 0.28).

Tibia of male palp almost three times long as patella (Fig. 5). Prolateral tibial apophysis expanded and rectangular distally with highly sclerotized fingerlike retrolateral tibial apophysis arising from the retrobasal part (Fig. 3). Without cluster of macrosetae on the retrodorsal part of the palpal tibia (Fig. 3). Paracymbium with the terminal part slightly hooked and 2 hairs on the basal arm of the paracymbium near its junction with the

cymbium (Figs. 4, 6). Tailpiece evenly tapered, pointed slightly upwards (Fig. 5). Protegulum narrow, elongate with nearly parallel margins (Fig. 4). Tip of distal suprategular apophysis slightly sclerotized, uneven, nearly perpendicular to lateral margins (Figs. 6, 11).

**Female.** Total length 1.08. Cephalothorax 0.54 long, 0.43 wide, pale yellow, black around eyes. Abdomen light grey. Clypeus 0.11 high. AME diameter 0.031, ALE 0.053, PME 0.050, PLE 0.053, AME separation 0.50 times their diameter, AME-ALE separation 0.24 times one ALE diameter, PME separation 0.63 times their diameter, PME-PLE separation 0.29 times one PLE diameter. Sternum 0.38 long, 0.34 wide. Coxa separation 0.95 times their width. Chelicerae pale yellow, with 4 promarginal teeth, 2 retromarginal teeth. Legs dusky yellow. Tibia 6.32 times longer than thick; Tm 0.30. Leg measurements: : 1.53 (0.41, 0.16, 0.38, 0.28, 0.30); : 1.33 (0.34, 0.16, 0.30, 0.25, 0.28); : 1.29 (0.33, 0.16, 0.25, 0.30, 0.25); : 1.75 (0.47, 0.17, 0.41, 0.34, 0.36).

Dorsal plate of epigynum trapezoidal in posterior view with nearly straight ventral margin (Fig. 10). Spermathecae separated by about their diameter (Figs. 7, 9). Copulatory ducts enclosed in a more or less sclerotized capsule, narrow at first, expanded to be a pair of quadrangled structures near spermathecae, narrow again and heaved upwards near fertilization ducts, loop once before entering spermathecae (Figs. 7, 9).

**Variation.** The total length ranges from 1.01 to 1.08 in males and from 1.06 to 1.09 in females. The carapace ranges in length from 0.55 to 0.56 in males and from 0.53 to 0.56 in females; in width from 0.38 to 0.39 in males and from 0.43 to 0.44 in females.

**Etymology.** Specific epithet from the Latin *rectangulus* (rectangular), referring to the shape of prolateral tibial apophysis.

**Distribution.** Known only from the type localities.

**Habitat.** This species was found under leaf litter of shaded area in pine and robur (*Quercus mongolica*) mixed forest.

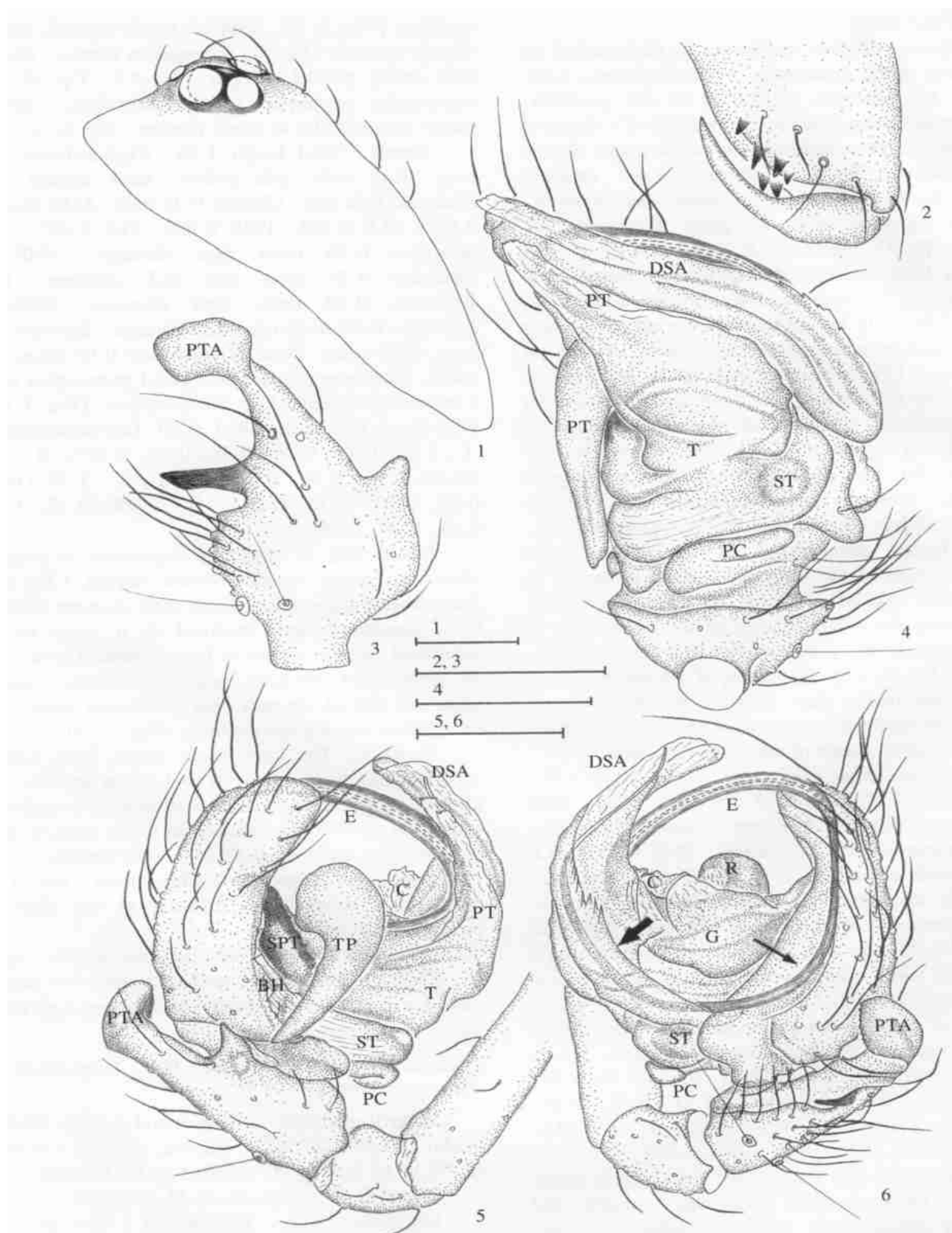
*Moebelia penicillata* (Westring, 1851) (Figs. 12-22)

*Erigone penicillata* Westring, 1851: 60.

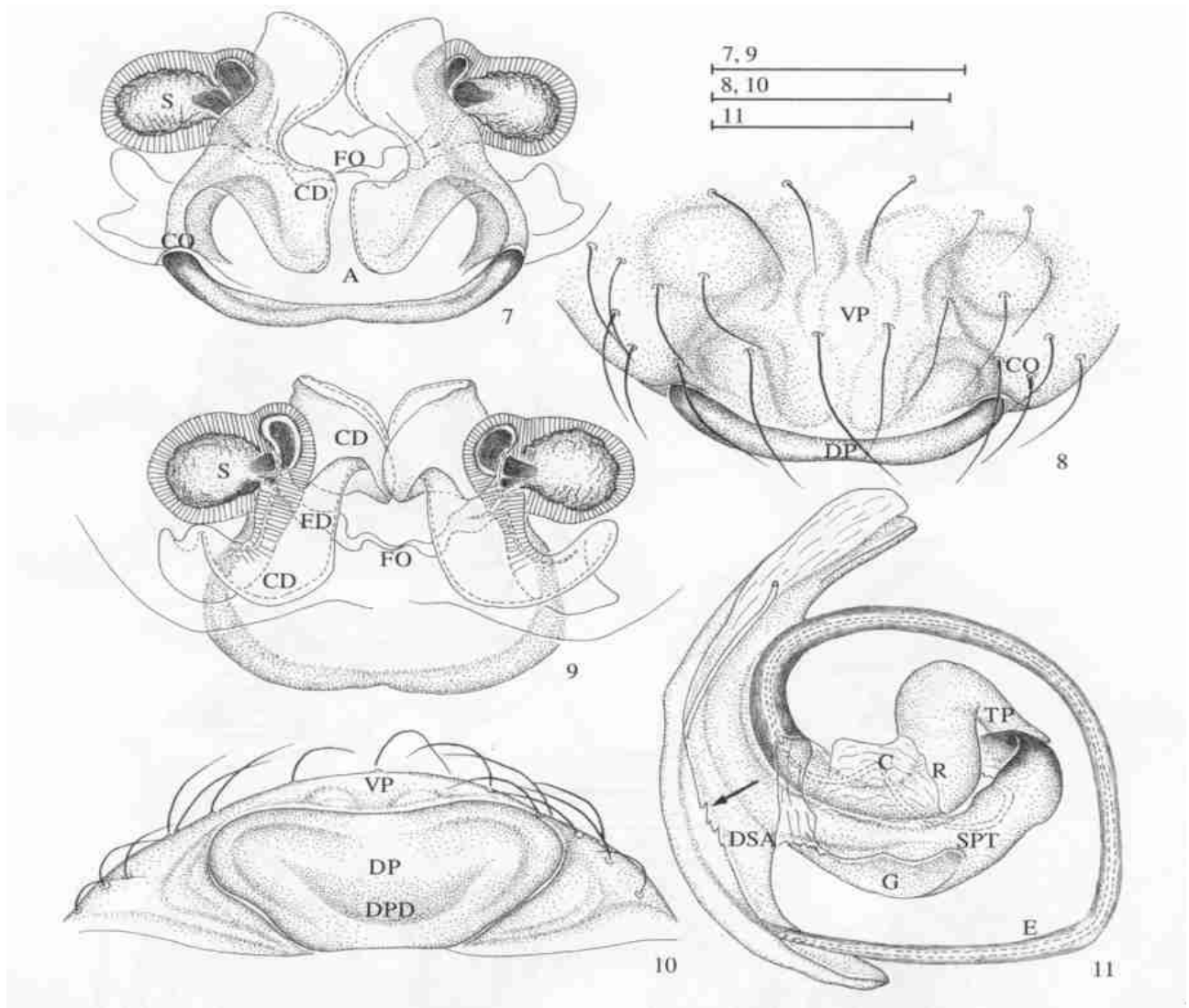
**Material examined.** 2 females and 2 males (RAS), Masku (60.6°N, 22.1°E), Kareva, Finland (54.4°N, 52.1°E), 15 Sep. 1959, collected by P. Lehtinen.

**Diagnosis.** See diagnosis of *M. rectangula*.

**Description.** Male. Total length 1.36-1.58 (n = 2). Cephalothorax 0.57-0.58 long, 0.55-0.57 wide, auburn, black around eyes. Clypeus 0.12 high. Eyes with black surroundings. AME diameter 0.031, ALE 0.063, PME 0.053, PLE 0.050, AME separation 0.50 times their diameter, AME-ALE separation 0.50 times



Figs. 1-6. *Moebelia rectangula* sp. nov. 1. Cephalothorax, lateral view. 2. Male left chelicera, frontal view. 3. Male left tibia, dorsal view. 4. Left male palp, ventral view. 5. Same, prolateral view. 6. Same, retrolateral view (bold arrow refers to distal suprategular apophysis fold; regular arrow refers to cymbial retromedian process). Scale bars = 0.1 mm.



Figs. 7-11. *Moebelia rectangularis* sp. nov. 7. Female vulva, ventral view. 8. Female epigynum, ventral view. 9. Female vulva, dorsal view. 10. Female epigynum, posterior view. 11. Male embolic division, ventral view (with DSA; arrow refers to distal suprategular apophysis fold). Scale bars = 0.1 mm.

one ALE diameter, PME separation 0.94 times their diameter, PME-PLE separation 0.38 times one PLE diameter. Sternum 0.38 long, 0.37 wide. Coxa separation 1.10 times their width. Chelicerae brown, with 3 promarginal teeth, 4 retromarginal teeth. Legs brown. Tibia 5.63 times longer than thick; Tm 0.57. Leg measurements: I: 1.78 (0.51, 0.19, 0.42, 0.36, 0.30); : 1.76 (0.52, 0.20, 0.40, 0.37, 0.24); : 1.42 (0.40, 0.19, 0.33, 0.27, 0.23); : 1.98 (0.53, 0.22, 0.52, 0.43, 0.28).

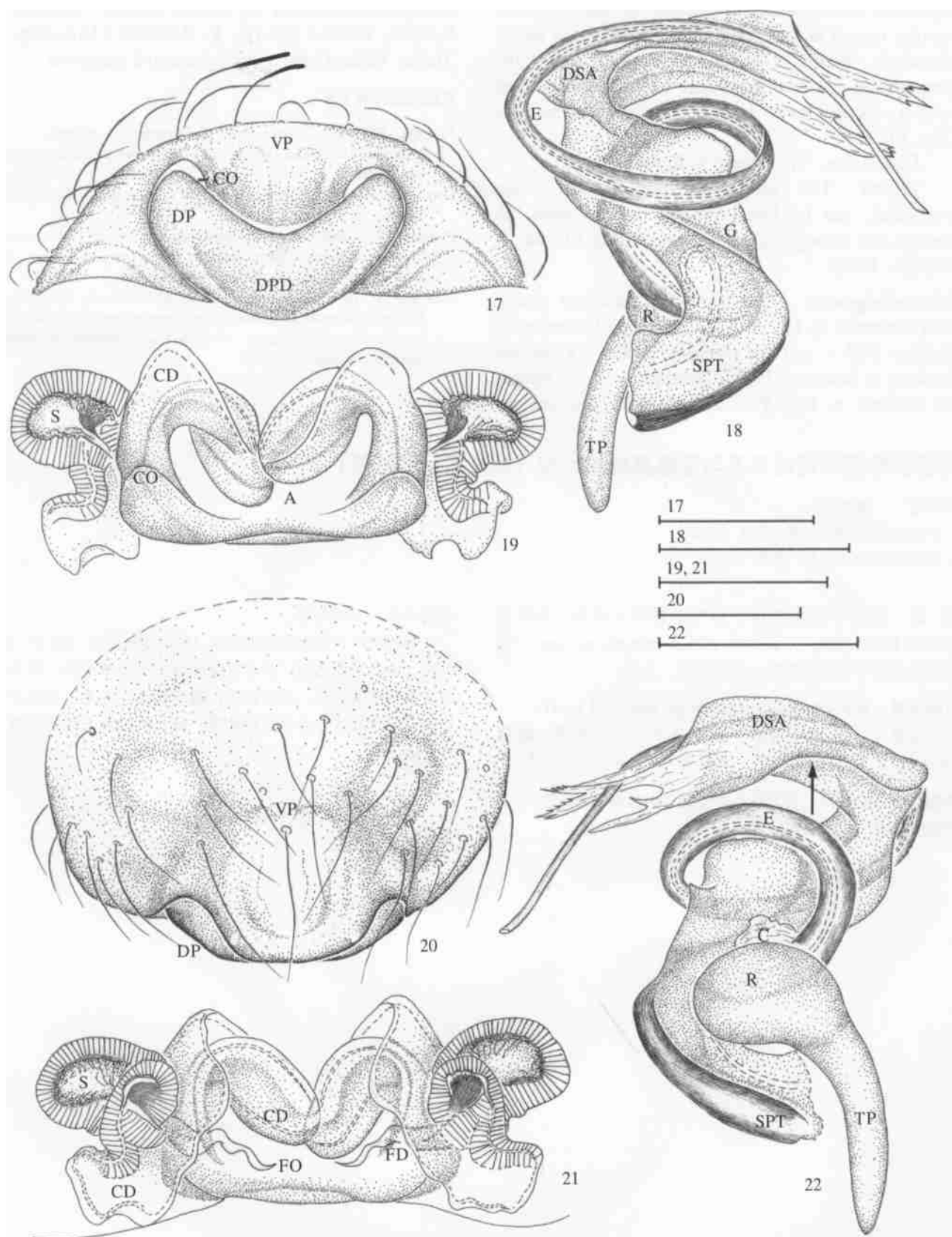
Tibia of male palp about one and a half times long as patella (Fig. 15). Prolateral tibial apophysis tapered; retrolateral tibial apophysis not highly sclerotized and undeveloped (Fig. 14). Palpal tibia with a cluster of macrosetae on the retrodorsal part (Fig. 14). Paracymbium spiral with the terminal part slightly hooked and 2 hairs on the basal arm of the paracymbium near its junction with the cymbium (Figs. 13, 16). Tailpiece

curved upwards (Fig. 15). Protegulum wide with curved prolateral margin (Fig. 13).

Female. Total length 1.88-1.22 ( $n = 2$ ). Cephalothorax 0.68-0.75 long, 0.49-0.58 wide, auburn, black around eyes. Clypeus 0.17 high. AME diameter 0.038, ALE 0.056, PME 0.059, PLE 0.056, AME separation 0.50 times their diameter, AME-ALE separation 0.61 times one ALE diameter, PME separation 0.79 times their diameter, PME-PLE separation 0.44 times one PLE diameter. Sternum 0.46 long, 0.44 wide. Coxa separation 1.28 times their width. Chelicerae brown with 5 promarginal teeth, 4 retromarginal teeth. Tibia 5.44 times longer than thick; Tm 0.60, Tm present. Legs brown. Tibia dorsal spines: 2-2-1-1; patella dorsal spine: 1-1-1-1. Leg measurements: : 1.91 (0.53, 0.22, 0.46, 0.39, 0.31); : 1.85 (0.54, 0.24, 0.41, 0.37, 0.29); : 1.66 (0.49, 0.22, 0.34, 0.34, 0.27); : 2.27



Figs. 12-16. *Moebelia penicillata*. 12. Cephalothorax, lateral view. 13. Left male palp, ventral view. 14. Male left tibia, dorsal view. 15. Left male palp, prolateral view (arrow refers to a triangular tooth on the outer margin of distal suprategular apophysis groove). 16. Same, retrolateral view (bold arrow refers to distal suprategular apophysis fold; regular arrow refers to cymbial retromedian process). Scale bars = 0.1 mm.



Figs. 17-22. *Moebelia penicillata*. 17. Female epigynum, posterior view. 18. Male embolic division (with DSA), dorsal view. 19. Female vulva, ventral view. 20. Female epigynum, ventral view. 21. Female vulva, dorsal view. 22. Male embolic division (with DSA; arrow refers to distal suprategular apophysis fold), ventral view. Scale bars = 0.1 mm.

(0.64, 0.23, 0.60, 0.49, 0.31).

Epigynum. Dorsal plate somewhat cordiform with

deep concave ventral margin (Fig. 17). Spermathecae separated by about twice their diameter (Fig. 19).

Copulatory ducts enclosed in a more or less sclerotized capsule, narrow at first, expanded to be a pair of highly sclerotized perfect oblong structures near the spermathecae, narrow again and with wave-like inner margins, loop once before entering spermathecae (Figs. 19, 21).

Distribution. Widespread in Europe.

Habitat. This species is common and easily overlooked, can be found on the bark of trees, in crevices and amongst lichen on tree trunks (Locket & Millidge, 1953).

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## 方胫莫蛛新种记述及其与毛笔莫蛛的比较 (蜘蛛目, 皿蛛科)

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**摘要** 记述中国皿蛛科 1 新纪录属和 1 新种: 莫蛛属 *Moebelia* Dahl, 1886, 方胫莫蛛 *Moebelia rectangula* sp. nov.。模式标本保存于中国科学院动物研究所, 北京。

**方胫莫蛛, 新种** *Moebelia rectangula* sp. nov. (图 1~11)

正模, 河北嶂石岩, 2005-09-12, 李枢强采; 副模 8, 12, 河北嶂石岩, 李枢强等采; 4, 7, 北

**关键词** 微蛛亚科, 古北区, 单型属, 触肢器, 外雌器。

**中图分类号** Q959.226

京门头沟, 王倩等采。

新种与产自芬兰的毛笔莫蛛 *Moebelia penicillata* (图 12~22) 相近, 两者主要区别: 前者触肢胫节无毛笔状毛簇; 前者触肢前侧胫节突方形, 后者锥形; 前者超盾片突无三角形片状突起; 前者外雌器后缘比后者宽; 前者纳精囊之间的距离窄于后者。